[0.65–0.98], X_{V3} 0.92 [0.66–0.98], X_A 0.94 [0.67–0.99], X_{A15} 0.93 [0.64–0.99] and inter-raters ICCs, X_{V1}0.91 [0.74–0.98], X_{V3} 0.91 [0.75–0.97], X_A 0.94 [0.85–0.99], X_{A15} 0.96 [0.87–0.99] ($P < 0.05$). Training also improved intra- and inter-raters agreement frequencies for ranges of movement (Y): respectively 75 and 70% before training, 84 and 76% after training ($P < 0.05$).

Discussion The stepped clinical assessment shows an excellent reliability to evaluate resistance against movement in chronic spastic paresis in the upper and lower limbs of adults. Training, associated with further improvement in reliability, needed nevertheless to be strengthened for shoulder extensors, fingers flexors and rectus femoris.

Keywords Spastic paresis; Spasticity; Reliability; Clinical assessment; Rehabilitation

Disclosure of interest The authors have not supplied their declaration of conflict of interest.

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Feasibility of self-rehabilitation program for upper limb after stroke in Benin

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Introduction Stroke is major cause of disability and is responsible of a high cost especially in developing countries. The self-rehabilitation program constitutes a new and original treatment for stroke patients, likely to reduce the upper limb impairment and to improve activity and participation of the disabled people. The goal of this study is to evaluate the feasibility and effectiveness of a self-rehabilitation protocol in Benin.

Methods Twelve stroke chronic patients have carried out self-rehabilitation program of upper limb (3 hours/day, 5 days/week for 2 weeks). The performance of these patients were evaluated before and after the self-rehabilitation program, by measuring the exercise number that patients were able to achieve during a three-hour session, and by measuring manual dexterity.

Results Twelve patients were effectively able to complete the entire program. The number of unimanuals exercises and self-mobilization realized during a three-hour session and the score of the Box and Block Test was improved in the self-rehabilitation program ($P < 0.05$).

Discussion/conclusion Self-rehabilitation program are feasible and are inexpensive as they do not involve a therapist. It is then a promising approach in stroke rehabilitation, particularly in developing countries, where the rehabilitation cost is usually supporting by patients.

Disclosure of interest The authors have not supplied their declaration of conflict of interest.

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Degree of muscle shortening in chronic hemiparesis in patients not treated with guided self-rehabilitation contracts (GSC)

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Objectives Antagonist muscle resistance, including due to muscle contracture, is a fundamental factor of motor impairment in spastic paresis. We aimed to quantify the degree of shortening in the main muscles involved in chronic hemiparesis (>1 year post-lesion), in patients following a conventional system of rehabilitation.

Methods From their first clinic visit in the neurorehabilitation unit of the PM&R department we retrospectively collected the assessments of passive range of motion (X_{V1}) – based on the 5-step clinical assessment, including the Tardieu Scale – against 8 key antagonists in the lower limb ($n = 19$ patients with chronic hemiparesis, age: 48 ± 13, mean ± SD; time since lesion 3.7 ± 3.8 years) and 13 antagonists in the upper limb ($n = 13$ patients, age: 39 ± 13, mean ± SD; time since lesion 5.2 ± 3.9 years), then derived coefficients of shortening (C_{SH}) by referring them to the normal expected amplitude (X_N), $C_{SH} = (X_N\text{-}X_{V1})/X_N$.

Results The higher coefficients of shortening were: vertical adductors (latissimus dorsi – pectoralis major – teres major), 36 ± 3%; shoulder extensors with flexed elbow (long head of triceps; latissimus dorsi) 33 ± 4%; horizontal adductors (pectoralis major), 23 ± 1%; gastrocnemius, 20 ± 1%; soleus, 15 ± 2%; gluteus maximus, 16 ± 3%; rectus femoris, 12 ± 1% and pronator teres, 12 ± 4%.

Conclusion Shoulder extensors, plantar flexors and gluteus maximus in patients untreated with self-stretching postures have undergone major muscle shortening in chronic hemiparesis. A future study could assess the effectiveness of stretching postures taught and applied from the early phase of stroke on shortening of these muscles.

Keywords Muscle shortening; Chronic hemiparesis

Disclosure of interest The authors have not supplied their declaration of conflict of interest.

Further readings

Gracies JM, Blondel R, Gault-Colas C, Bayle N. Contrat d'autorééducation guidée dans la parésie spastique. De Boeck Editions, ©Association neurorééducation en mouvement; 2013 [108 p., ISBN 978-2-35327-169-6].

Gracies JM, Bayle N, Vinti M, Alkandari S, Vu P, Loche CM, et al. Five-step clinical assessment in spastic paresis. Eur J Phys Rehabil Med 2010;46(3):411–21.

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Comparative shortening of different muscles in patients with chronic hemiparesis treated in guided self-rehabilitation contracts

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Objectives Muscle contracture is one of the main factors of motor impairment in spastic paresis, and particularly in hemiparesis. We

aimed to quantify the degree of contracture in 8 key muscles at a chronic stage after the lesion.
Methods Four independent raters assessed 18 adults with chronic hemiparesis (age: 50 ± 14, mean ± SD; time since lesion 5.3 ± 2.4 years) treated with guided self-rehabilitation contracts (GSC) [1], using the 5-step clinical assessment [2] previously described, of which step 2 evaluates passive range of motion (angle of arrest at slow speed, X_{V1}) and step 3 measures the angle of catch at fast speed (X_{V3}). Data from the 4 investigators were averaged. Coefficients of shortening ($C_{SH} = (X_N - X_{V1})/X_N$; X_N, normal expected amplitude) and of spasticity ($C_{SP} = (X_{V1} - X_{V3})/X_{V1}$) were derived. Muscles assessed were shoulder extensors (SE), elbow flexors (EF), wrist flexors (WF), finger flexors (FF), gluteus maximus (GM), rectus femoris (RF), soleus (SO) and gastrocnemius muscles (GM).
Results Mean values were: SE, C_{SH}: 0.21 ± 0.03; C_{SP}: 0.25 ± 0.03; EF, C_{SH}: 0.04 ± 0.02; C_{SP}: 0.27 ± 0.04; WF, C_{SH}: 0.07 ± 0.02; C_{SP}: 0.24 ± 0.04; FF, C_{SH}: 0.16 ± 0.04; C_{SP}: 0.32 ± 0.04; GM, C_{SH}: 0.16 ± 0.03; C_{SP}: 0.13 ± 0.02; RF, C_{SH}: 0.09 ± 0.01; C_{SP}: 0.26 ± 0.03; SO, C_{SH}: 0.15 ± 0.02; C_{SP}: 0.10 ± 0.01; GM, C_{SH}: 0.21 ± 0.01; C_{SP}: 0.12 ± 0.01. There was a suggestion of negative correlation between C_{SH} and C_{SP} (Pearson's $r = -0.37$, NS).
Conclusion In chronic hemiparesis, plantar flexors and shoulder extensors are the most shortened muscles, followed by gluteus maximus and finger flexors. This might represent an incentive to promote more aggressive posturing in the acute stages to maintain length of these important muscle groups.
Keywords Muscle contracture; Chronic hemiparesis; Self-rehabilitation
Disclosure of interest The authors have not supplied their declaration of conflict of interest.
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[1] Gracies JM, Blondel R, Gault-Colas C, Bayle N. Contrat d'autorééducation guidée dans la parésie spastique. De Boeck Editions, ©Association Neurorééducation en Mouvement; 2013 [108 p., ISBN 978-2-35327-169-6].
[2] Gracies JM, Bayle N, Vinti M, Alkandari S, Vu P, Loche CM, et al. Five-step clinical assessment in spastic paresis. Eur J Phys Rehabil Med 2010;46(3):411–21.

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MRI ameliorates the prediction of further clinical evolution even months after ischemic stroke

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Background Late recovery after a first ischemic stroke is highly variable and its predictors are unknown. The present study aims at determining whether MRI data obtained one to four months after a first ischemic stroke help to predict clinical evolution up to 2 years.
Methods Patients included in the PERFORM MRI study, an ancillary study of the PERFORM randomized control trial of terutroban against aspirin in secondary prevention of vascular ischemic events were selected. Mixed-effect regression modelling was used to test whether MRI data obtained one to four months after a first ischemic stroke ameliorate the prediction of further recovery, up to 2 years, compared to clinical data alone. Outcomes to predict were disability (modified Rankin Scale [mRS] and NIH Stroke Scale [NIHSS]) and cognition (MMSE, Isaac's Set Test [IST] and Zazzo's Cancellation Test [ZCT]). MRI markers were designed as the total lesion load on FLAIR (FLAIR_vol) and brain volume (brain parenchymal fraction [BPF]) on T1, both normalized to intracranial cavity volume. Age, gender, level of education and initial value of the outcome to predict were systematically entered as covariates in predictive models based on clinical data alone. FLAIR_Vol, BPF and microbleed number were added to those variables in predictive models based on clinical and imaging data. Predictive ability of both types of models were compared.
Findings Five hundred and ninety-two patients of mean age 67.3 ± 7.8 years were included. Models based on clinical and MRI data were significantly better predictors of mRS, MMSE, IST and ZCT, compared to models based on clinical data alone.
Interpretation MRI data that can be easily extracted from routine sequences help to predict further recovery even months after a first ischemic stroke. The use of MRI in this context may help to select patients for which rehabilitation will be the most beneficial.
Keywords Ischemic stroke; MRI; Brain parenchymal fraction; Disability; Cognitive impairment; Post-stroke recovery
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How to predict requirement for rehabilitation following stroke: An analysis of the Rhône-Alpes inpatient database

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Objective To predict the requirement for rehabilitation unit after acute care hospitalization for stroke: how many and which type of rehabilitation unit?
Population Data were obtained from the Rhône-Alpes inpatient database in Acute Care and Rehabilitation. All acute care hospitalization for stroke in Rhône-Alpes region where considered.
Method Five groups of acute stroke inpatient where determined according to the type of discharge required (rehabilitation, nursing home or home…) applying recommendation of the French Society of Physical Medicine and Rehabilitation (Sofmer). These groups were determined analyzing information contained in database (age, comorbidity, medical procedure, wards…). For each of the 5 groups, the type of discharge required was compared with the real discharge of the patient. When patients were admitted in rehabilitation units, logistic regression model was used to analyze effect of the type of rehabilitation (neurological unit or no) on dependence score improvement.
Results (1) Type of discharge required: among the 7511 discharges of surviving acute stroke, 858 (11%) had no indication for rehabilitation and should be supported in nursing home, 389 (5%) had very serious clinical conditions and required specialized post-acute care rehabilitation units, 1255 (17%) required an hospitalization in general or geriatric rehabilitation unit because of their bad prognosis factors of functional outcome and 1865 (25%) required a PMR unit. (2) When hospitalization in a PMR unit was required, 896 (48%) were actually admitted in rehabilitation unit, of which 703 in PMR. Those admitted in PMR had a greater probability of functional improvement compared with no neurological unit (aOR = 1.64 [1.09–2.46]) after adjustment for age, comorbidity, initial level of dependence, and the duration of hospitalization.
Discussion Predicting and characterizing the requirement for rehabilitation center following acute stroke can help to optimize the orientation in the care pathway for better efficiency.